D109 Rec'd PUT/PTO 08 SEP 2004

SEQUENCE LISTING

```
<110> Green, Michael R.
      Gollan, Timothy J.
<120> ALTERING VIRAL TROPISM
<130> 07917-166US1
<150> PCT/US03/07323
<151> 2003-03-07
<150> US 60/362,655
<151> 2002-03-08
<160> 26
<170> FastSEQ for Windows Version 4.0
<210> 1
<211> 14
<212> PRT
<213> Artificial Sequence
<220>
<223> concensus sequence
Ile Glu Gly Pro Thr Leu Arg Gln Trp Leu Ala Ala Arg Ala
<210> 2
<211> 5
<212> PRT
<213> Artificial Sequence
<223> binding peptide sequence
<400> 2
Ala Pro Asp Thr Pro
1
<210> 3
<211> 7
<212> PRT
<213> Artificial Sequence
<223> kidney targeting sequence
<400> 3
Cys Leu Pro Val Ala Ser Cys
1
                 5
```

```
<210> 4
<211> 1980
<212> DNA
<213> Murine leukemia virus
<400> 4
aattettetg atgeteagag gggteagtae tgettegece ggeteeagte eteateaagt
                                                                        60
ctataatatc acctgggagg taaccaatgg agatcgggag acggtatggg caacttctgg
                                                                       120
caaccacct ctgtggacct ggtggcctga ccttacccca gatttatgta tgttagccca
                                                                       180
ccatggacca tcttattggg ggctagaata tcaatcccct ttttcttctc ccccggggcc
                                                                       240
cccttgttgc tcagggggca gcagcccagg ctgttccaga gactgcgaag aacctttaac
                                                                       300
ctccctcacc cctcggtgca acactgcctg gaacagactc aagctagacc agacaactca
                                                                       360
taaatcaaat gagggatttt atgtttgccc cgggccccac cgcccccgag aatccaaqtc
                                                                       420
atgtgggggt ccagactcct tctactgtgc ctattggggc tgtgagacaa ccggtagagc
                                                                       480
ttactggaag ccctcctcat catgggattt catcacagta aacaacaatc tcacctctqa
                                                                       540
ccaggetgtc caggtatgca aagataataa gtggtgcaac cccttagtta ttcggtttac
                                                                       600
agacgccggg agacgggtta cttcctggac cacaggacat tactggggct tacgtttgta
                                                                       660
tgtctccgga caagatccag ggcttacatt tgggatccga ctcagatacc aaaatctagg
                                                                       720
accecgegte ccaataggge caaaccecgt tetggeagae caacagecae tetecaagee
                                                                       780
caaacctgtt aagtcgcctt cagtcaccaa accacccagt gggactcctc tctcccctac
                                                                       840
ccaacttcca ccggcgggaa cggaaaatag gctgctaaac ttagtagacg gagcctacca
                                                                       900
agccctcaac ctcaccagtc ctgacaaaac ccaagagtgc tggttgtgtc tagtagcggg
                                                                       960
accccctac tacgaagggg ttgccgtcct gggtacctac tccaaccata cctctgctcc
                                                                      1020
agccaactgc teegtggeet eecaacacaa gttgaeeetg teegaagtga eeggaeaggg
                                                                      1080
actotgoata ggagcagtto coaaaacaca toaggoodta tgtaatacca cocagacaag
                                                                      1140
cagtcgaggg tcctattatc tagttgcccc tacaggtacc atgtgggctt gtagtaccgg
                                                                      1200
gcttactcca tgcatctcca ccaccatact gaaccttacc actgattatt gtgttcttgt
                                                                      1260
cgaactctgg ccaagagtca cctatcattc ccccagctat gtttacggcc tgtttgagag
                                                                      1320
atccaaccga cacaaaagag aaccggtgtc gttaaccctg gccctattat tgggtggact
                                                                      1380
aaccatgggg ggaattgccg ctggaatagg aacagggact actgctctaa tggccactca
                                                                      1440
gcaattccag cagctccaag ccgcagtaca ggatgatctc agggaggttg aaaaatcaat
                                                                      1500
ctctaaccta gaaaagtctc tcacttccct gtctgaagtt gtcctacaga atcgaagggg
                                                                      1560
cctagacttg ttatttctaa aagaaggagg gctgtgtgct gctctaaaag aagaatgttg
                                                                      1620
cttctatgcg gaccacacag gactagtgag agacagcatg gccaaattga gagagaggct
                                                                      1680
taatcagaga cagaaactgt ttgagtcaac tcaaggatgg tttgagggac tgtttaacag
                                                                      1740
atccccttgg tttaccacct tgatatctac cattatggga cccctcattg tactcctaat
                                                                      1800
gattttgctc ttcggaccct gcattcttaa tcgattagtc caatttgtta aagacaggat
                                                                      1860
atcagtggtc caggetetag ttttgactca acaatateae cagetgaage etatagagta
                                                                      1920
cgagccatag ataaaataaa agattttatt tagtctccag aaaaaggggg gaatgaaaga
                                                                      1980
<210> 5
<211> 7
<212> PRT
<213> Artificial Sequence
<220>
<223> kidney targeting sequence
<400> 5
Cys Gly Ala Arg Glu Met Cys
<210> 6
<211> 9
<212> PRT
<213> Artificial Sequence
```

```
<223> brain targeting sequence
Cys Leu Ser Ser Arg Leu Asp Ala Cys
<210> 7
<211> 21
<212> PRT
<213> Artificial Sequence
<220>
<223> brain targeting sequence
<400> 7
Trp Arg Cys Val Leu Arg Glu Gly Pro Ala Gly Gly Cys Ala Trp Phe
Asn Arg His Arg Leu
<210> 8
<211> 13
<212> PRT
<213> Artificial Sequence
<220>
<223> Synthetically generated peptide
Cys Ala Ala Gly Arg Gly Asp Ser Pro Thr Arg Cys
                 5
<210> 9
<211> 39
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
<400> 9
tgcgcggccg ctggccgtgg cgattctccc acgcgttgt
                                                                        39
<210> 10
<211> 39
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
<400> 10
acaacgcgtg ggagaatcgc cacggccagc ggccgcgca
                                                                        39
<210> 11
```

```
<211> 21
<212> PRT
<213> Artificial Sequence
<220>
<223> Synthetically generated peptide
<400> 11
Cys Ala Ala Ala Gln Gly Ala Thr Phe Ala Leu Arg Gly Asp Asn Pro
                                     10
Gln Gly Thr Arg Cys
            20
<210> 12
<211> 50
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
ggccgctcaa ggcgcaacgt tcgcgctcag aggcgataat ccacagggga
                                                                         50
<211> 50
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
cgcgtcccct gtggattatc gcctctgagc gcgaacgttg cgccttgagc
                                                                         50
<210> 14
<211> 6
<212> PRT
<213> Artificial Sequence .
<220>
<223> Synthetically generated peptide
<400> 14
Gly Arg Gly Asp Ser Pro
<210> 15
<211> 14
<212> PRT
<213> Artificial Sequence
<223> Synthetically generated peptide
<400> 15
Gln Gly Ala Thr Phe Ala Leu Arg Gly Asp Asn Pro Gln Gly
```

```
1
               5
                                     10
<210> 16
<211> 22
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
<400> 16
ttttgtcaag accgacctgt cc
                                                                         22
<210> 17
<211> 22
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
<400> 17
cgggagcggc gataccgtaa ag
                                                                         22
<210> 18
<211> 21
<212> PRT
<213> Artificial Sequence
<220>
<223> Synthetically generated peptide
Cys Ala Ala Glu Gln Arg Leu Gly Asn Gln Trp Ala Val Gly His
Leu Met Thr Arg Cys
            20
<210> 19
<211> 47
<212> DNA
<213> Artificial Sequence
<220>
<223> Synthetically generated oligonucleotide
<400> 19
ggccgagcag cgcctgggca accagtgggc cgtcggccac ctgatga
                                                                         47
<210> 20
<211> 47
<212> DNA
<213> Artificial Sequence
<223> Synthetically generated oligonucleotide
```

<400> 20 cgcgtcatca ggtggccgac ggcccactgg ttgcccaggc gctgctc	47
<210> 21 <211> 71 <212> DNA <213> Artificial Sequence	
<220> <223> Synthetically generated oligonucleotide	
<400> 21 ggccgcttca caccttgtaa agtgcgcaga gaaggaaaag acgttctgcg tcaacggcgt gagtgttaca g	60 71
<210> 22 <211> 84 <212> DNA <213> Artificial Sequence	
<220> <223> Synthetically generated oligonucleotide	
<400> 22 gccgtaggtc ttaaccctgt aacactcacc gccgttgacg cagaacgtct tttccttctc tgcgcacttt acaaggtgtg aagc	60 84
<210> 23 <211> 83 <212> DNA <213> Artificial Sequence	
<220> <223> Synthetically generated oligonucleotide	
<400> 23 ggttaagacc tacggctatc tgatgtgcaa gtgtccgaac gagttcacgg gtgaccggtg ccagaactac gtcatcgcgt cga	60 83
<210> 24 <211> 71 <212> DNA <213> Artificial Sequence	
<220> <223> Synthetically generated oligonucleotide	
<400> 24 cgcgtcgacg cgatgacgta gttctggcac cggtcacccg tgaactcgtt cggacacttg cacatcagat a	60 71
<210> 25 <211> 21 <212> PRT <213> Artificial Sequence	
-220	

```
<223> Synthetically generated peptide
```

<400> 25

Cys Ala Ala Ala Gln Gly Ala Thr Phe Ala Leu Arg Gly Glu Asn Pro 1 5 10 15 Gln Gly Thr Arg Cys 20

<210> 26

<211> 56

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetically generated peptide

<400> 26

Cys Ala Ala Ala Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr

1 5 10 15

Phe Cys Val Asn Gly Gly Glu Cys Tyr Arg Val Lys Thr Tyr Gly Tyr 20 25 30

Leu Met Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn 35 40 45

Tyr Val Ile Ala Ser Thr Arg Cys
50 55